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Changing the research climate

Bette Hileman's "Insights" article suggests that research to narrow uncertainties in climate-change science is "a misplaced effort" and that the time has come to take action to reduce emissions of atmospheric greenhouse gases rather than conduct further research. A much more judicious insight would be to make decisions based on present understanding, with cognizance of the consequences of taking action and of possible consequences of not taking action, while conducting research that will lead to improved understanding. There remain large uncertainties in first-order questions regarding Earth's climate system that must be substantially reduced to permit quantitative decision-making; key among them is how much to roll back emissions to achieve a target reduction in global warming. A decision to halt research forecloses the opportunity to make better decisions than can be made at present.

Among the issues regarding future climate, the change in the global mean temperature is the key single index. However, the sensitivity of the climate system to an increased concentration of CO_2 is quite uncertain. According to the thorough and exhaustive review of present understanding of climate change as reflected in the 2001 report of the Intergovernmental Panel on Climate Change (IPCC), the "climate sensitivity [to CO_2 doubling] is likely to be in the range 1.5 to 4.5 ºC."

This large uncertainty range is not particularly useful from the perspective of making decisions on how much to reduce emissions of greenhouse gases. While the value at the low end of the range, 1.5 ºC, might not be so severe, a change in global mean temperature at the high end of the range for a doubling of CO_2, which will occur well before the end of this century, would constitute an overwhelming change in Earth's climate. In this context, one must note that the increase in global mean temperature from the middle of the last ice age to the present interglacial age is, again according to IPCC, estimated to have been 5 or 6 ºC.

One of the key reasons for uncertainty in climate sensitivity is the uncertainty in forcing over the industrial period due to radiative influences of anthropogenic aerosols. There is good reason to believe that the cooling influence of aerosols may be negating a substantial fraction of the warming influence of incremental concentrations of greenhouse gases. If that turns out to be correct, then the indicia of global warming that Hileman cites are a consequence of a much lower total forcing than would be reckoned on the basis of greenhouse gases alone, and as a consequence the climate sensitivity must be toward the high end of the IPCC range. It is thus all the more important to find this out sooner rather than later so that important decisions on reduction of greenhouse gases can be made on a sound scientific basis.

This sort of a situation argues on behalf of more research to reduce uncertainties in knowledge of the climate system, not less.

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